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Gene predicts heart attack response and cardiac damage

January 30 2008

A protein has been found that influences the response of the heart to a lack of oxygen and blood flow, such as occurs during a heart attack, a team of Yale School of Medicine researchers report today in Nature.

This finding may present a new therapeutic approach to treating loss of blood flow and oxygen to the heart.

The protein, macrophage migration inhibitory factor (MIF), was found to activate an important cellular stress response enzyme called AMP-activated protein kinase (AMPK). AMPK is a key regulator of cellular energy balance and protects the heart from injury during a heart attack.

MIF had previously been shown to regulate the immune response, contributing to disease processes such as hardening of the arteries, arthritis, and the body's response to infection.

"We found that when MIF is released in response to a lack of oxygen, it causes the activation of AMPK," said Richard Bucala, M.D., a professor of rheumatology and pathology who co-authored the study. "Thus, this protein which contributes to inflammatory diseases has a protective metabolic effect in the heart."

The researchers discovered that mice lacking the MIF gene had a deficient AMPK response and suffered more severe heart attacks than mice with an intact MIF gene. A common variation in the MIF gene in people also leads to lower levels of MIF protein expression. The team's

research showed that cells from people with this genetic variant also have less activation of AMPK, which might place them at higher risk for cardiac damage during a heart attack.

“This suggests that we might be able to identify individuals, based on their genetic characteristics, who are likely to suffer more cardiac damage during a heart attack,” said senior author Lawrence Young, M.D., professor of cardiovascular medicine, and physiology.

Source: Yale University